

## WHAT IS CLAIMED IS:

1. A suspension liner sleeve adapted to provide an interface between a residual limb and a prosthetic socket, said liner sleeve comprising:

an elongate, generally conical body portion formed of a material that is at least radially elastically extendible from a relaxed non-extended condition and including proximal and distal end areas; and

at least one resilient seal element protruding radially from the liner sleeve body portion between said proximal and distal end areas, said at least one resilient seal element extending around at least one peripheral portion of the liner sleeve body portion between said proximal and distal end areas.

2. The suspension liner sleeve as claimed in claim 1, wherein said at least one resilient seal element is integrally formed in one piece with the liner sleeve body portion.

3. The suspension liner sleeve as claimed in claim 1, wherein said at least one resilient seal element is a separate seal body attached to the liner sleeve body portion.

4. The suspension liner sleeve as claimed in claim 1, wherein said at least one resilient seal element comprises multiple sealing surfaces.

5. The suspension liner sleeve as claimed in claim 2, wherein said at least one resilient seal element comprises multiple resilient seal elements comprising multiple sealing surfaces.

6. The suspension liner sleeve as claimed in claim 3, wherein said at least one resilient seal element comprises multiple sealing surfaces.

7. The suspension liner sleeve as claimed in claim 1, further comprising a reinforcement material associated with the liner sleeve body portion extending over a length at least coinciding with the location of said at least one resilient seal element and in a proximal direction relative to said resilient seal element, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion.

8. The suspension liner sleeve as claimed in claim 1, further comprising a reinforcement material associated with the liner sleeve body portion extending over a length at least coinciding with the location of said at least one resilient seal element and in a distal direction relative to said resilient seal element, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion.

9. The suspension liner sleeve as claimed in claim 1, including multiple, axially spaced resilient seal elements protruding radially from the liner sleeve body portion between said proximal and distal end areas, each of said resilient seal elements extending around a peripheral portion of the liner sleeve body portion.

10. The suspension liner sleeve as claimed in claim 9, wherein said resilient seal elements are integrally formed in one piece with the liner sleeve body portion.

11. The suspension liner sleeve as claimed in claim 9, wherein said resilient seal elements are formed as separate seal bodies attached to the liner sleeve body portion.

12. A prosthesis system comprising:

a suspension liner sleeve adapted to provide an interface between a residual limb and a prosthetic socket, said liner sleeve having an elongate, generally conical body portion formed of a material that is at least radially extendible from a relaxed non-extended condition and including proximal and distal end areas;

at least one resilient seal element protruding radially from the liner sleeve body portion and extending around at least one peripheral portion of the liner sleeve body portion between said proximal and distal end areas;

and a prosthetic socket configured to receive said liner in close fitting relationship when the liner sleeve body portion is disposed on a residual limb, said at least one resilient seal element bridging any gap between said liner sleeve body portion and an interior wall of said socket in the area of the at least one resilient seal element.

13. The prosthesis system as claimed in claim 12, said socket including an evacuation device enabling evacuation of air between the distal end area of said liner sleeve body portion and said socket after the liner sleeve body portion has been inserted within said socket to an extent such that said resilient seal element bridges any gap between the liner sleeve body portion and an interior wall of said socket.

14. The prosthesis system as claimed in claim 12, wherein said at least one resilient seal element is integrally formed in one piece with the liner sleeve body portion.

15. The prosthesis system as claimed in claim 12, wherein said at least one resilient seal element is a separate seal body attached to the liner sleeve body portion.

16. The prosthesis system as claimed in claim 12, wherein said liner sleeve body portion includes a reinforcement material associated with the liner sleeve body portion and extending over a length at least coinciding with

the location of the at least one resilient seal element and at least in a proximal direction relative to said resilient seal element, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the lower liner sleeve body portion.

17. The suspension liner sleeve as claimed in claim 12, wherein said liner sleeve body portion includes a reinforcement material associated with the liner sleeve body portion extending over a length at least coinciding with the location of said at least one resilient seal element and in a distal direction relative to said resilient seal element, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion

18. The prosthesis system as claimed in claim 12, said prosthetic socket having an interior wall including at least one stepped portion located peripherally along the interior wall at a location where the at least one resilient seal element was located when the suspension liner sleeve body portion is fully inserted in the prosthetic socket.

19. A method of locating and retaining a vacuum suspension liner sleeve within a prosthetic socket comprising the steps:

providing at least one peripheral resilient seal element around at least one peripheral portion of a vacuum suspension liner sleeve body portion formed of a material that is at least radially extendible from a relaxed non-extended condition;

mounting the vacuum suspension liner sleeve body portion on a residual limb;

placing the vacuum suspension liner sleeve body portion containing the residual limb within a prosthesis socket until the resilient seal element engages an interior wall of the prosthesis socket; and

causing the resilient seal element to isolate the distal end of the socket interior disposed distally of the resilient seal element from atmosphere.

20. The method as claimed in claim 19, including providing hypobaric pressure within the distal end area of the prosthetic socket between a distal end area of the vacuum suspension liner sleeve body portion and the distal end area of said socket after said seal has engaged the socket.

21. The method as claimed in claim 19, including providing a reinforcement material integrated within the suspension liner sleeve body portion such that said reinforcement material provides axial elastic stiffness of the linear sleeve portion in the area of the body portion adjacent the reinforcement material that is greater than elastic stiffness of the liner sleeve body portion in a radial direction in the area of the reinforcement material.

22. A suspension liner sleeve adapted to provide an interface between a residual limb and a prosthetic socket, said liner sleeve comprising:

- an elongate, generally conical body portion formed of a material that is at least radially elastically extendible from a relaxed non-extended condition and including proximal and distal end areas;

- at least one recessed portion extending around at least one peripheral portion of the liner sleeve body portion between said proximal and distal end areas; and

- at least one resilient seal element secured within the at least one recessed portion and protruding radially therefrom, said at least one resilient seal element extending around the at least one recessed portion.

23. The suspension liner sleeve as claimed in claim 22, wherein said at least one resilient seal element is a separate seal body attached to the liner sleeve body portion.

24. The suspension liner sleeve as claimed in claim 22, wherein said at least one resilient seal element comprises a base member secured to the liner sleeve body portion within the at least one recessed portion.

25. The suspension liner sleeve as claimed in claim 24, wherein said at least one resilient seal element comprises a radially outwardly pitched member connected to a proximal end of the base member and a radially inwardly pitched member connected to a proximal end of the outwardly pitched member.

26. The suspension liner sleeve as claimed in claim 24, wherein said at least one resilient seal element comprises a curved member connected to a proximal end of the base member and protruding radially from the liner sleeve body portion.

27. The suspension liner sleeve as claimed in claim 24, wherein the at least one recessed portion of the liner sleeve body portion has a depth substantially of the same dimension as the thickness of the at least one portion of the resilient seal element.

28. The suspension liner sleeve as claimed in claim 22, further comprising a reinforcement material associated with the liner sleeve body portion extending over a length at least coinciding with the location of said at least one resilient seal element and in a distal direction relative to said resilient seal element, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion.

29. The suspension liner sleeve as claimed 28, wherein the reinforcement material extends substantially around the entire distal end area of the liner sleeve body portion.

30. A suspension liner sleeve adapted to provide an interface between a residual limb and a prosthetic socket, said liner sleeve comprising:

an elongate, generally conical body portion formed of a material that is at least radially elastically extendible from a relaxed non-extended condition and including proximal and distal end areas; and

at least one recessed portion extending around at least one peripheral portion of the liner sleeve body portion between said proximal and distal end areas.

31. The suspension liner sleeve as claimed in claim 30, further comprising a reinforcement material associated with the liner sleeve body portion extending over a length at least coinciding with the location of said at least one recessed portion and in a distal direction relative to said recessed portion, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion.

32. The prosthesis system as claimed in claim 30, wherein said liner sleeve body portion includes a reinforcement material associated with the liner sleeve body portion and extending over a length at least coinciding with the location of the at least one recessed portion and at least in a proximal direction relative to said at least one recessed portion, said reinforcement material providing greater elastic stiffness in an axial direction relative to a radial direction of the liner sleeve body portion.